

What is claimed is:

1. A variable optical delay line with a large continuous tuning range comprising:

an incremental variable optical delay line for receiving an optical signal to provide the optical signal with a delay selected from a sequence of incrementally differing delays;

5 and serially optically coupled with the incremental delay line, a continuously variable optical delay line for receiving the optical signal to provide a continuous delay from a range of delays substantially encompassing a delay increment in the incremental delay line.

10 2. The variable delay line of claim 1 wherein the incremental delay line comprises a plurality of optical paths having incrementally different optical path lengths and an optical switch for switching the signal to a path of selected path length.

15 3. The variable delay line of claim 2 wherein the plurality of optical paths comprise a set of paths having at least one region of parallel paths and a second region wherein each path differs in curvature to produce incrementally different path lengths.

4. The variable delay line of claim 1 wherein the continuously variable delay line comprises all pass optical filter.

20 5. The variable delay line of claim 4 wherein the all pass filter comprises a multistage all pass filter comprising a plurality of ring resonators optically coupled to an optical waveguide.

6. The variable delay line of claim 1 wherein the continuously variable delay line comprises a chirped grating.

7. The variable delay line of claim 2 wherein the continuously variable delay line comprises an all pass optical filter.

5 8. The variable delay line of claim 3 wherein the continuously variable delay line comprises an all pass optical filter.

 9. The variable delay line of claim 3 wherein the continuously variable delay line comprises a multistage all pass optical filter comprising a plurality of ring resonators optically
10 coupled to an optical waveguide.